

SCO INTERNATIONAL PHYSICS OLYMPIAD

OFFICIAL QUESTION PAPER

SCO International Physics Olympiad | Class 8

Designed from Class 8 Physics syllabus pathways and aligned with SCO Olympiad preparation, practice, reporting, and future-ready academic growth.

- class-fit physics reasoning for Grade 8 learners globally
- chapter-wise coverage: force, friction, sound, electricity, light, natural phenomena, astronomy
- case-study and achievers questions for Olympiad-level application
- answer key and explanations included for guided preparation

Force & Pressure	Friction	Sound	Electric Current
Natural Phenomena	Light	Solar System	Achievers

GRADE 8 | Official Question Paper | SCO IPhO

School Connect Online - SCO International Olympiad

Candidate Guidelines

Total Questions	50 questions Time: 60 minutes Total Marks: 60
Marking Pattern	Questions 1-40 carry 1 mark each. Questions 41-50 carry 2 marks each. No negative marking.
Sections	Section A: Concept & Application Section B: Assertion-Reason Section C: Case Study Section D: Achievers Section
Attempt Rule	Each question has one correct option. Choose only one option for every question.
Exam Conduct	Calculators and electronic devices are not permitted. Read diagrams and units carefully before answering.
PDF Use	This Word document is formatted for clean PDF conversion and website viewing.

Name
Registration ID School:
Set	Class 8 IPhO Set A

Section A: Concept & Application — Questions 1-30 | 1 mark each

1 A 3 kg toy car is pushed with a net force of 18 N on a smooth floor. What is its acceleration?

A. 3 m/s²

B. 5 m/s²

C. 6 m/s²

D. 54 m/s²

Answer & Explanation: C. Using $F = m \times a$, $a = F/m = 18/3 = 6 \text{ m/s}^2$.

2 Two students push the same box in opposite directions. One pushes with 30 N east and the other with 12 N west. What is the net force?

A. 42 N east

B. 18 N east

C. 18 N west

D. 12 N west

Answer & Explanation: B. Opposite forces are subtracted. $30 \text{ N} - 12 \text{ N} = 18 \text{ N}$ toward the stronger push, east.

3 A force of 600 N acts on an area of 0.03 m². What pressure is produced?

A. 180 Pa

B. 2,000 Pa

C. 20,000 Pa

D. 200,000 Pa

Answer & Explanation: C. Pressure = force/area = $600/0.03 = 20,000 \text{ Pa}$.

4 A water tank base has an area of 0.5 m². If water exerts a pressure of 4,000 Pa on the base, what force acts on it?

A. 800 N

B. 2,000 N

C. 4,500 N

D. 8,000 N

Answer & Explanation: B. Force = pressure \times area = $4,000 \times 0.5 = 2,000 \text{ N}$.

5 Why does the wall of a dam need to be thicker near the bottom?

A. Water is warmer at the bottom

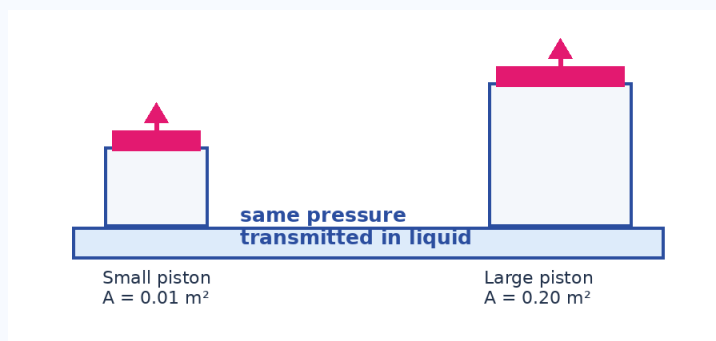
B. Water pressure increases with depth

C. Water becomes lighter at the bottom

D. Air pressure is lower at the bottom

Answer & Explanation: B. Liquid pressure increases with depth, so the bottom of a dam must withstand the greatest pressure.

- 6 In the hydraulic press shown, a force of 80 N is applied on a small piston of area 0.01 m^2 . The large piston has area 0.20 m^2 . What force is produced on the large piston?



Hydraulic press: equal pressure is transmitted through the fluid.

- | | |
|------------|-------------|
| A. 160 N | B. 800 N |
| C. 1,600 N | D. 16,000 N |

Answer & Explanation: C. Pressure = $80/0.01 = 8,000 \text{ Pa}$. Force on large piston = $8,000 \times 0.20 = 1,600 \text{ N}$.

- 7 A mechanic oils a bicycle chain. Which statement best explains why the bicycle moves more smoothly?

- | | |
|--|---|
| A. Oil increases the weight of the chain | B. Oil reduces friction between moving surfaces |
| C. Oil increases air pressure around the chain | D. Oil makes the chain magnetic |

Answer & Explanation: B. Lubricants form a thin layer between surfaces and reduce friction.

- 8 Why are ball bearings used in many machines?

- | | |
|--|--|
| A. They convert rolling friction into sliding friction | B. They convert sliding friction into rolling friction |
| C. They completely remove gravity | D. They increase pressure on the surface |

Answer & Explanation: B. Rolling friction is much smaller than sliding friction, so ball bearings reduce energy loss.

- 9 A 50 N book lies on a table. If the coefficient of friction is 0.4, what is the approximate maximum frictional force before the book starts sliding?

- | | |
|---------|----------|
| A. 10 N | B. 20 N |
| C. 50 N | D. 125 N |

Answer & Explanation: B. Maximum friction = $\mu N = 0.4 \times 50 = 20 \text{ N}$.

10 A car takes longer to stop on a wet road than on a dry road mainly because:

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|---|---|
| A. Wet roads remove gravity | B. Wet roads reduce friction between tyres and road |
| C. Wet roads increase the mass of the car | D. Wet roads reduce air pressure |

Answer & Explanation: B. Water lowers the effective grip, so the braking friction is reduced and stopping distance increases.

11 A tuning fork produces sound when struck because:

- | | |
|----------------------|------------------------------------|
| A. it becomes hot | B. it vibrates |
| C. it reflects light | D. it becomes electrically charged |

Answer & Explanation: B. Sound is produced by vibrating objects.

12 Two sounds have frequencies of 250 Hz and 500 Hz. Which sound has a higher pitch?

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|-----------------------------|---------------------------------------|
| A. 250 Hz | B. 500 Hz |
| C. Both have the same pitch | D. Pitch does not depend on frequency |

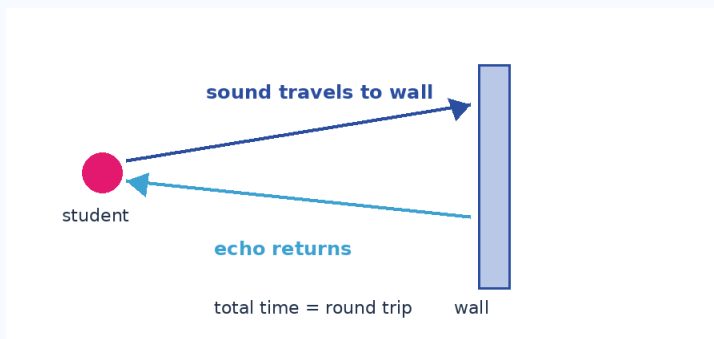
Answer & Explanation: B. Higher frequency means higher pitch.

13 A drum is beaten harder. Which property of the sound mainly increases?

- | | |
|-----------------|-------------------|
| A. Loudness | B. Pitch |
| C. Speed in air | D. Frequency only |

Answer & Explanation: A. Beating harder gives larger amplitude vibrations, making the sound louder.

14 A student shouts toward a wall and hears the echo after 1.8 seconds. If the speed of sound is 340 m/s, how far is the wall?



Echo time includes travel to the wall and back.

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|----------|----------|
| A. 153 m | B. 306 m |
| C. 612 m | D. 680 m |

Answer & Explanation: B. The sound covers a round trip. Distance to wall = $(340 \times 1.8)/2 = 306$ m.

15 A sound wave travels in air at 340 m/s with a frequency of 170 Hz. What is its wavelength?

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|----------|----------|
| A. 0.5 m | B. 1 m |
| C. 2 m | D. 170 m |

Answer & Explanation: C. Wavelength = speed/frequency = 340/170 = 2 m.

16 Why can sound not travel through a vacuum?

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|-----------------------------|--|
| A. Vacuum has too much air | B. Sound needs material particles to vibrate |
| C. Vacuum absorbs all light | D. Sound changes into electricity |

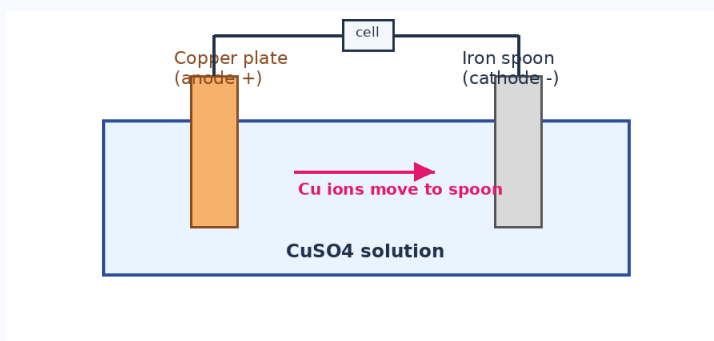
Answer & Explanation: B. Sound is a mechanical wave and needs a material medium.

17 A tester bulb glows brightly in salt water but not in distilled water. What is the best explanation?

- | | |
|--|--------------------------------------|
| A. Salt water contains ions that conduct electricity | B. Distilled water has more pressure |
| C. Salt water reflects more light | D. Distilled water has no atoms |

Answer & Explanation: A. Dissolved salt forms ions, and ions carry charge through the liquid.

18 In copper electroplating of an iron spoon, which arrangement is correct?



Copper electroplating setup with copper ions moving to the spoon.

- | | |
|---|---|
| A. Iron spoon as positive electrode, copper plate as negative electrode | B. Iron spoon as negative electrode, copper plate as positive electrode |
| C. Both electrodes made of plastic | D. No electrolyte is required |

Answer & Explanation: B. Copper ions must gain electrons and deposit on the object, so the spoon is connected to the negative terminal and copper plate to the positive terminal.

19 Gas bubbles appear near electrodes when current passes through acidified water. This shows:

- | | |
|--------------------------|--|
| A. magnetic effect only | B. chemical effect of electric current |
| C. no current is flowing | D. sound is produced by light |

Answer & Explanation: B. Formation of gases at electrodes is a chemical change caused by electric current.

20 Which liquid is most likely to conduct electricity well?

- | | |
|--------------------|-------------------|
| A. Distilled water | B. Sugar solution |
| C. Salt solution | D. Vegetable oil |

Answer & Explanation: C. Salt solution contains mobile ions; sugar solution and oil do not provide enough ions.

21 Lightning is best described as:

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|---------------------------------------|---|
| A. a reflection of sunlight | B. a large electric discharge in the atmosphere |
| C. sound travelling faster than light | D. a chemical reaction in clouds only |

Answer & Explanation: B. Charge separation in clouds can cause a sudden discharge, seen as lightning.

22 Why is a lightning conductor connected deep into the ground?

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|--------------------------------|---|
| A. To make the building taller | B. To provide a safe path for charge to flow into Earth |
| C. To store sunlight | D. To stop rain from falling |

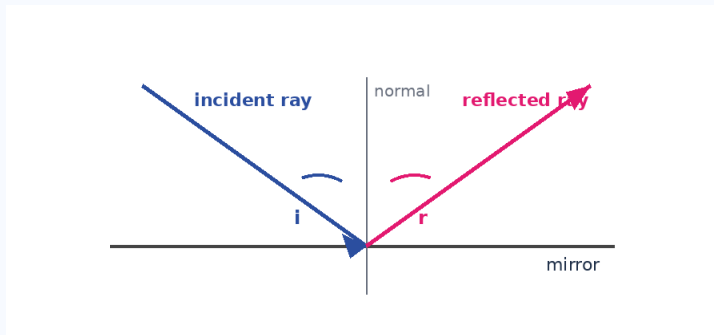
Answer & Explanation: B. Earthing gives lightning charge a low-resistance path to the ground.

23 During an earthquake indoors, the safest immediate action among these is to:

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| A. stand near a glass window | B. run to use a lift |
| C. drop, cover under a sturdy table, and hold on | D. touch electric wires |

Answer & Explanation: C. Dropping and taking cover protects against falling objects and broken glass.

24 In the mirror diagram, the angle of incidence is 35° . What is the angle of reflection?



Law of reflection: angle i equals angle r .

- | | |
|---------------|---------------|
| A. 20° | B. 35° |
| C. 55° | D. 70° |

Answer & Explanation: B. By the law of reflection, angle of incidence equals angle of reflection.

25 Which image is formed by a plane mirror?

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|--------------------------------|----------------------------------|
| A. Real, inverted and enlarged | B. Virtual, erect and same size |
| C. Real, erect and smaller | D. Virtual, inverted and smaller |

Answer & Explanation: B. A plane mirror forms a virtual, erect image of the same size as the object.

26 Two plane mirrors are placed at 60° to each other. How many images are formed for an object between them?

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|------|------|
| A. 2 | B. 3 |
| C. 5 | D. 6 |

Answer & Explanation: C. Number of images = $360/\theta - 1$ when $360/\theta$ is an integer. $360/60 - 1 = 5$.

27 A kaleidoscope works mainly because of:

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|-------------------------|-----------------------------------|
| A. dispersion only | B. multiple reflection in mirrors |
| C. evaporation of water | D. electroplating |

Answer & Explanation: B. Repeated reflections in inclined mirrors create many patterns.

28 A pencil partly dipped in water appears bent because light:

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|--|---|
| A. travels only in straight lines in water | B. changes direction when passing from water to air |
| C. stops at the water surface | D. turns into sound |

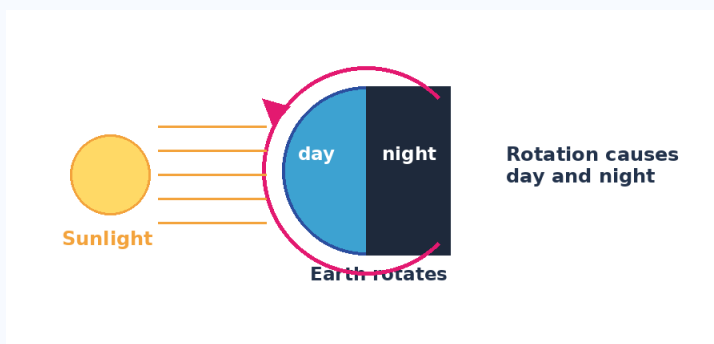
Answer & Explanation: B. This apparent bending is due to refraction when light changes medium.

29 Which statement correctly compares stars and planets?

- | | |
|--|---|
| A. Stars reflect sunlight; planets produce their own light | B. Stars produce their own light; planets mainly reflect sunlight |
| C. Both produce their own light | D. Neither can be seen at night |

Answer & Explanation: B. Stars are luminous; planets are non-luminous bodies seen by reflected sunlight.

30 The diagram shows Earth receiving sunlight. What causes day and night?



Day and night are caused by rotation of Earth.

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|---|---|
| A. Earth revolves around the Moon | B. Earth rotates on its axis |
| C. The Sun moves around Earth every day | D. The Moon blocks sunlight every night |

Answer & Explanation: B. Earth's rotation makes different parts face toward or away from the Sun.

Section B: Assertion and Reason — Questions 31-40 | 1 mark each

Use the options: A: Both A and R are true, and R correctly explains A | B: Both true, but R does not explain A | C: A true, R false | D: A false, R true.

31 Assertion (A): A sharp knife cuts vegetables more easily than a blunt knife. Reason (R): For the same force, smaller contact area produces greater pressure.

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|--|--|
| A. Both A and R are true, and R correctly explains A | B. Both A and R are true, but R does not explain A |
| C. A is true, R is false | D. A is false, R is true |

Answer & Explanation: A. A sharp edge has smaller area, so pressure is greater for the same force.

32 Assertion (A): Oiling machine parts reduces wear. Reason (R): Lubrication reduces friction between moving surfaces.

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|--|--|
| A. Both A and R are true, and R correctly explains A | B. Both A and R are true, but R does not explain A |
| C. A is true, R is false | D. A is false, R is true |

Answer & Explanation: A. Reduced friction decreases heating and wear.

33 Assertion (A): A high-frequency sound has a high pitch. Reason (R): Pitch depends mainly on frequency.

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|--|--|
| A. Both A and R are true, and R correctly explains A | B. Both A and R are true, but R does not explain A |
| C. A is true, R is false | D. A is false, R is true |

Answer & Explanation: A. Pitch is the sensation related to frequency.

34 Assertion (A): Salt solution conducts electricity better than sugar solution. Reason (R): Salt solution contains mobile ions.

- | | |
|---|---|
| A. Both A and R are true, and R correctly explains A | B. Both A and R are true, but R does not explain A |
| C. A is true, R is false | D. A is false, R is true |

Answer & Explanation: **A.** Ions allow charge to move through the liquid.

35 Assertion (A): Lightning conductors help protect buildings. Reason (R): They provide a safe conducting path for charge to the ground.

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|---|---|
| A. Both A and R are true, and R correctly explains A | B. Both A and R are true, but R does not explain A |
| C. A is true, R is false | D. A is false, R is true |

Answer & Explanation: **A.** The reason explains how the conductor protects the structure.

36 Assertion (A): The reflected ray from a plane mirror follows a definite direction. Reason (R): The angle of reflection equals the angle of incidence.

- | | |
|---|---|
| A. Both A and R are true, and R correctly explains A | B. Both A and R are true, but R does not explain A |
| C. A is true, R is false | D. A is false, R is true |

Answer & Explanation: **A.** The law of reflection fixes the direction of the reflected ray.

37 Assertion (A): The Moon appears to change shape during a month. Reason (R): The visible sunlit part of the Moon changes as its position changes relative to Earth and Sun.

- | | |
|---|---|
| A. Both A and R are true, and R correctly explains A | B. Both A and R are true, but R does not explain A |
| C. A is true, R is false | D. A is false, R is true |

Answer & Explanation: **A.** The changing visible lit portion causes phases.

38 Assertion (A): Stars twinkle more than planets. Reason (R): Starlight is affected more by atmospheric refraction because stars appear as point sources.

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|---|---|
| A. Both A and R are true, and R correctly explains A | B. Both A and R are true, but R does not explain A |
| C. A is true, R is false | D. A is false, R is true |

Answer & Explanation: **A.** Atmospheric refraction causes rapid apparent brightness changes for point-like stars.

39 Assertion (A): Rubbing a plastic comb can make it attract small paper bits. Reason (R): Rubbing can transfer electric charge between objects.

- | | |
|---|---|
| A. Both A and R are true, and R correctly explains A | B. Both A and R are true, but R does not explain A |
| C. A is true, R is false | D. A is false, R is true |

Answer & Explanation: **A.** The comb becomes charged and attracts neutral paper pieces by electrostatic effects.

40 Assertion (A): Friction is always harmful and should be removed completely. Reason (R): Friction helps us walk and helps brakes stop vehicles.

- | | |
|--|--|
| A. Both A and R are true, and R correctly explains A | B. Both A and R are true, but R does not explain A |
| C. A is true, R is false | D. A is false, R is true |

Answer & Explanation: D. The assertion is false because friction is useful in many situations; the reason is true.

Section C: Case Study — Questions 41-45 | 2 marks each

41 **Case Study:** Passage: In a science exhibition, students use two connected syringes filled with water to lift a small book. When force is applied to the narrow syringe, the wider syringe lifts the book. Which principle is demonstrated?

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| A. Pascal's principle | B. Only magnetic attraction |
| C. Only evaporation | D. Dispersion of light |

Answer & Explanation: A. Pressure applied to an enclosed liquid is transmitted equally in all directions.

42 **Case Study:** Passage: The same students compare a smooth tile and sandpaper by sliding a wooden block across both. The block is harder to move on sandpaper. Which conclusion is most suitable?

- | | |
|---|---------------------------------------|
| A. Rougher surfaces usually produce more friction | B. Smooth surfaces always stop motion |
| C. Friction is independent of surfaces | D. Friction acts only in liquids |

Answer & Explanation: A. Sandpaper has greater roughness, so it offers greater resistance to relative motion.

43 **Case Study:** Passage: A bell is placed inside a glass jar connected to a vacuum pump. As air is removed, the bell is still seen vibrating but the sound becomes faint. What does this show?

- | | |
|------------------------------|----------------------------------|
| A. Light needs air | B. Sound needs a material medium |
| C. Vibrations stop in vacuum | D. Electricity becomes sound |

Answer & Explanation: B. The bell vibrates, but with less air there are fewer particles to carry sound.

44 **Case Study:** Passage: An iron spoon is connected to the negative terminal in copper sulphate solution, and a copper plate is connected to the positive terminal. What happens on the spoon?

- | | |
|----------------------------------|---|
| A. Copper gets deposited | B. The spoon becomes invisible |
| C. The spoon produces only sound | D. Copper disappears from both electrodes |

Answer & Explanation: A. Copper ions gain electrons at the negative spoon and form a copper layer.

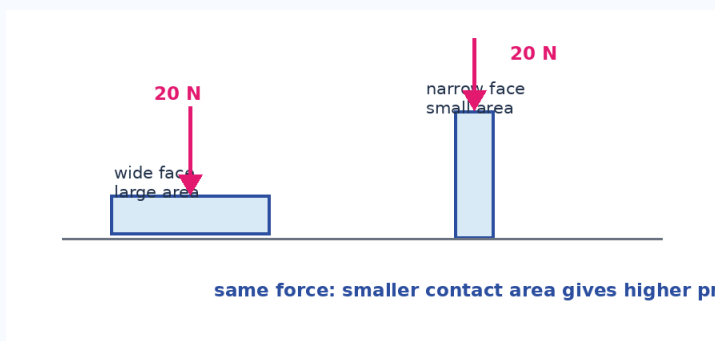
45 Case Study: Passage: Two plane mirrors are set at 90° in a model mirror maze. How many images of a small object are expected?

- | | |
|------|------|
| A. 1 | B. 2 |
| C. 3 | D. 4 |

Answer & Explanation: C. Number of images = $360/90 - 1 = 3$.

Section D: Achievers Section — Questions 46-50 | 2 marks each

46 Achievers: A 20 N brick is placed first on its wide face of area 0.02 m^2 and then on its narrow face of area 0.01 m^2 . What is the pressure on the narrow face?



Same force on different contact areas.

- | | |
|-------------|--------------|
| A. 500 Pa | B. 1,000 Pa |
| C. 2,000 Pa | D. 20,000 Pa |

Answer & Explanation: C. Pressure = $20/0.01 = 2,000 \text{ Pa}$. Smaller area gives higher pressure.

47 Achievers: A 30 kg cart moving at 4 m/s stops uniformly in 5 s due to friction. What is the average frictional force?

- | | |
|---------|----------|
| A. 12 N | B. 24 N |
| C. 60 N | D. 150 N |

Answer & Explanation: B. Deceleration = $4/5 = 0.8 \text{ m/s}^2$. Force = $m \times a = 30 \times 0.8 = 24 \text{ N}$.

48 Achievers: A ship sends a sound pulse to the sea bed and receives the echo after 2 s. If sound travels in seawater at 1,500 m/s, what is the depth?

- | | |
|------------|------------|
| A. 750 m | B. 1,000 m |
| C. 1,500 m | D. 3,000 m |

Answer & Explanation: C. Total distance = $1,500 \times 2 = 3,000 \text{ m}$. Depth is half of round trip = 1,500 m.

49 **Achievers:** A student observes that a tester bulb glows dimly in lemon juice but brightly in salt solution. Which inference is best?

- | | |
|-----------------------------------|---|
| A. Both solutions conduct equally | B. Salt solution allows more current through the tester |
| C. Lemon juice is an insulator | D. Brightness is unrelated to current |

Answer & Explanation: **B.** A brighter bulb indicates better conduction and larger current in the circuit.

50 **Achievers:** Planet X takes 12 Earth years to revolve around the Sun and 10 hours to rotate once. Which statement is correct?

- | | |
|--|--------------------------------|
| A. One day on X is 12 years | B. One year on X is 10 hours |
| C. One day on X is 10 hours and one year is 12 Earth years | D. Planet X has no day or year |

Answer & Explanation: **C.** Rotation determines the day; revolution around the Sun determines the year.

Answer Key

Compact answer grid for quick checking and web/PDF use.

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
1: C	2: B	3: C	4: B	5: B	6: C	7: B	8: B	9: B	10: B
11: B	12: B	13: A	14: B	15: C	16: B	17: A	18: B	19: B	20: C
21: B	22: B	23: C	24: B	25: B	26: C	27: B	28: B	29: B	30: B
31: A	32: A	33: A	34: A	35: A	36: A	37: A	38: A	39: A	40: D
41: A	42: A	43: B	44: A	45: C	46: C	47: B	48: C	49: B	50: C